

**UNITED STATES DEPARTMENT OF COMMERCE****United States Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
|-----------------|-------------|----------------------|---------------------|

09/497,320 02/03/00 GHAEMMAGHAMI

MM91/0508

Joseph A. Sawyer Jr.
Sawyer & Associates
PO BOX 51418
Palo Alto CA 94303

| | |
|----------|-------------|
| A | E0545/1516P |
| EXAMINER | |

| | |
|-----------|--------------|
| APR 17, J | PAPER NUMBER |
|-----------|--------------|

DATE MAILED:

05/08/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

| | | | |
|------------------------------|-------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 09/497,320 | Applicant(s) GHAEMMAGHAMI ET AL. | |
| | Examiner José R. Díaz | Art Unit 2815 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2000 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> | 20) <input type="checkbox"/> Other: |

DETAILED ACTION

Upon further review of the restriction requirement in Paper No. 5, this requirement has been withdrawn.

Drawings

➤ Figures 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

➤ The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: the reference sign "213". Correction is required.

➤ The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: the reference sign "202". Correction is required.

➤ The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "212" has been used to designate both "the entire active area" and "the photoresist mask". Correction is required.

➤ The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "204" has been used to designate both "the source region" and "the drain region". Correction is required.

➤ The drawings are objected to under 37 CFR 1.83(a) because they fail to show "the LDD region" as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Correction is required.

Claim Rejections - 35 USC § 112

- The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 8, each claim recites the limitation of "the appropriate area", which is not defined by the Specification and seems to be a relative term.

Regarding claims 2 and 9, each recitation of "the active area" lacks proper antecedent basis.

Regarding claims 6 and 13, each recitation of "the source region and the drain region" lacks proper antecedent basis.

Regarding claim 10, the limitation of "1 to 2 μm thick" is not supported by the Specification. See for example page 4, line 23, wherein Applicant discloses a range of about 0.1 to 0.2 μm .

Regarding claims 3-5, 7, 11-12, and 14 are rejected to as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102

- The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application

Art Unit: 2815

by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

➤ Claims 1-3, 6, 8-10 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ilderem et al. (US Patent No. 5,675,166).

Regarding claims 1 and 8, Ilderem et al. teach a semiconductor device (columns 1-8) comprising: a thin photoresist (34) and a halo implant (33,36) (See Figure 5 and 6).

Regarding claims 2, 6, 9 and 13, Ilderem et al. teach that the thin photoresist (34) covers a substantial amount of source and drain regions (See Figures 4-6 and col. 5, lines 29-30).

Regarding claims 3 and 10, Ilderem et al. teach that the thin photoresist (34) is between about 0.1 to 0.2 μm thick (see col. 5, lines 5-7).

Claim Rejections - 35 USC § 103

➤ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

➤ This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

➤ Claims 4-5, 7, 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ilderem et al. (US Patent No. 5,675,166) in view of Applicant's Specification.

Regarding claims 4-5, 7, 11-12 and 14, Ilderem et al. fail to teach a LDD region, implanting at about 45° angle, and a photoresist comprised of DUV. However, Applicant acknowledges that it is well known in the art to form a DUV photoresist mask, a LDD region, and a halo region by implantation of ions at about 45° (See page 1, lines 6-9 and page 4, lines 3-4). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Ilderem et al. to include the steps of forming a DUV photoresist mask, a LDD region, and a halo region by implantation of ions at about 45°, as described on page 1, lines 6-9 and page 4, lines 3-4 of Applicant's Specification. The ordinary artisan would have been motivated to modify Ilderem et al. in the manner described above for at least the purpose of providing adequate hot-carrier protection.

Conclusion

➤ The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pan (US Patent No. 5,595,919) discloses method of making self-aligned halo process for reducing junction capacitance. Hook et al. (US Patent No. 6,083,794) disclose method to perform selective drain engineering with a non-critical mask. Wang et al. (US Patent No. 6,171,913 B1) disclose process for manufacturing a

Art Unit: 2815

single asymmetric pocket implant. Krivokapic et al. (US Patent No. 6,008,094) disclose optimization of logic gates with implants to form asymmetric channel regions. Rodder et al. (US Patent No. 5,976,937) disclose transistor having ultrashallow source and drain junctions with reduced gate overlap.


Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 8:00 - 5:00 Monday through Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD
May 2, 2001


EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800